

Application Serial No. 10/738,398
Reply to Office Action of September 29, 2005

PATENT
Docket: CU-3402

Amendments To The Claims

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

Listing of claims:

1. (currently amended) A method for forming an MIM capacitor of a semiconductor device, the method comprising the steps of:

i) forming a via at a first insulating layer in order to expose a lower metal wire;

ii) forming a first barrier layer at a surface of the first insulating layer including the via;

iii) forming a metal layer on the first insulating layer in which the first barrier layer is formed;

iv) forming a capacitor lower electrode layer by depositing one of TaN, Ta, Ti, TiN, and Ru in amorphous state on the metal layer after forming a second barrier layer and a third barrier layer ~~by depositing one of TaN, Ta, Ti, TiN, and Ru on the metal layer;~~

v) forming a dielectric layer by oxidizing the upper surface of the capacitor lower electrode layer;

vi) forming a capacitor upper electrode layer by depositing one of TaN, Ta, Ti, TiN, and Ru on the dielectric layer, wherein the capacitor lower electrode layer, the dielectric layer, and the upper electrode are formed in-situ without equipment change; and

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vii) patterning the capacitor upper electrode layer, the dielectric layer, and the capacitor lower electrode layer, thereby forming the capacitor.

2. (Original) The method according to claim 1, wherein the capacitor lower electrode layer is formed using a metal capable of forming a layer having high dielectric constant.

3. (Original) The method according to claim 2, wherein the metal is formed with an amorphous structure by using one process selected from the group consisting of CVD, ALD and sputtering processes.

4. (Cancelled)

5. (Original) The method according to claim 2, wherein, in step v), the capacitor lower electrode layer is oxidized by a thickness about 10Å to 800Å.

6. (Original) The method according to claim 5, wherein the capacitor lower electrode layer is oxidized by using one process selected from the group consisting of an oxygen plasma treatment process, an ozone plasma treatment process, and an oxygen annealing treatment process.

7. (Original) The method according to claim 6, wherein the oxygen plasma treatment process is carried out with a power of 100W to 30,000W.

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8. (Original) The method according to claim 6, wherein the oxygen plasma treatment process is carried out with a power of 200W to 30,000W.

9-10. (Cancelled)